

CHEM 3530
Chapters 4 - Homework Answers

4.1 $\Delta S_{\text{sys}} = +121 \text{ J/K}$

$\Delta S_{\text{surr}} = -121 \text{ J/K}$

4.2 $q = -45.1 \text{ kJ}$ (energy removed as heat)

$\Delta S = -161 \text{ J/K}$

4.3 $V_2 = 2.9 \text{ L}$

4.4 (a) $\Delta S = 56 \text{ J/K}$

(b) $\Delta S = 56 \text{ J/K}$

4.5 $\Delta S = -15.8 \text{ J/K}$

4.6 (a) $\Delta_r S^\circ = 87.8 \text{ J/mol-K}$

(b) $\Delta S_{\text{surr}} = -87.8 \text{ J/mol-K}$

4.7 (a) $\Delta_r S^\circ = -386.1 \text{ J/K}$

(b) $\Delta_r S^\circ = 92.6 \text{ J/K}$

4.8 (a) $w = -1530 \text{ J}$, $q = +1530 \text{ J}$, $\Delta U = 0$, $\Delta H = 0$, $\Delta S = 5.29 \text{ J/K}$, $\Delta G = -1530 \text{ J}$

(b) $w = -620 \text{ J}$, $q = +620 \text{ J}$, $\Delta U = 0$, $\Delta H = 0$, $\Delta S = 5.29 \text{ J/K}$, $\Delta G = -1530 \text{ J}$

4.9 $\Delta H = 46.4 \text{ kJ}$, $\Delta U = 43.3 \text{ kJ}$, $\Delta S = 126.0$

4.10 (a) $\Delta G = -234.4 \text{ kJ}$

(b) $\Delta G = -228.4 \text{ kJ}$ (small diff. probably results from error in one of tables)

4.11 $T = 320 \text{ K} = 47 \text{ }^\circ\text{C}$

Spontaneous at higher T

4.12 (a) 2.18 kJ

(b) 0.0 kJ

(c) -1.36 kJ